Code No: 123BK

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, March - 2017
FLUID MECHANICS
(Common to CE, CEE)

Time: 3 Hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART – A

(25 Marks)

1.a)	Explain hydrostatic law.	[2]
b)	Explain vacuum pressure.	[3]
c)	Define steady and unsteady flow.	[2]
d)	Explain stream and velocity potential functions.	[3]
e)	List the assumptions of Euler's equation of motion.	[2]
f)	Write down the disadvantages of orifice meter.	[3]
g)	What is Magnus effect?	[2]
h)	Write a brief note on Prandtl contribution.	[3]
i)	List the characteristics of turbulent flow.	[2]
j)	Explain total energy line.	[3]

PART - B

(50 Marks)

2.a) Define the following:
i) Atmospheric pressure
ii) Gauge pressure
iii) Vacuum pressure and
iv) Absolute pressure

b) What are mechanical gauges? Name three important mechanical gauges. [5+5]

OR

3.a) Define the following terms:
i) Total pressure, and
ii) Centre of pressure.

b) Derive expression for total pressure and centre of pressure for a vertically immersed surface. [5+5]

4. Find the velocity and acceleration at a point (1, 2, 3) after 1 sec, for a three dimensional flow given by $u = yz + t, v = xz - t, w = xy$ m/s. [10]

OR

5. Describe in detail the classification of flows given one example for each category. [10]

6. A 300 mm × 150 mm venturimeter is provided in a vertical pipeline carrying oil of specific gravity 0.9, flow being upward. The difference in elevation of the throat section and entrance section of the venturimeter is 300mm. The differential U- tube mercury manometer shows a gauge deflection of 250mm.Calculate:
a) The discharge of oil, and
b) The pressure difference between the entrance section and the throat section.
Take the co-efficient of meter as 0.98 and specific gravity of mercury as 13.6. [5+5]

OR

7. Discuss in detail the classification of orifices and notches. [10]

8. Define the following terms:
a) Laminar boundary layer
b) Turbulent boundary layer
c) Laminar sub layer
d) Boundary layer thickness. [10]

OR

9. How will you determine whether a boundary layer flow is attached flow, detached flow or on the verge of separation? [10]

10. Derive formulae for calculating loss of head due to:
a) Sudden enlargement and
b) Sudden contraction [5+5]

OR

11. Explain briefly the following with the help of a neat sketch:
a) Hydraulic gradient line (H.G.L)
b) Energy gradient line (E.G.L). [5+5]

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